

Managing MILCON and Munitions

Moving Target Mortar Range-North/South, Dam Neck Annex

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Objective



- Provide a case study of an incident that created a risk to site workers
 - Provide site background information
 - Identify key issues
 - Summarize efforts to get project safely back on track
- Discuss lessons learned from the project
- Identify resources to help minimize similar incidents at other sites
- Discuss 2nd case study where lessons learned were applied

BLUF



- Construction on ER sites MUST be coordinated between EV, the Navy CM and the construction contractor
- Cleared boundaries MUST be clearly marked in the field
- All limits to construction operations must be clearly understood by all parties and clearly documented
- Impacts from safety danger zones during UXO clearing can impact not only construction, but base operations.
- RPM, CM, UXO and construction contractors/subcontractors must all clearly rly understand all possible impacts:
 - If you have concerns raise them
 - If you have questions ask them
 - If you have doubts get a 2nd opinion, or 3rd
 - Support will always be provided!

Site Background



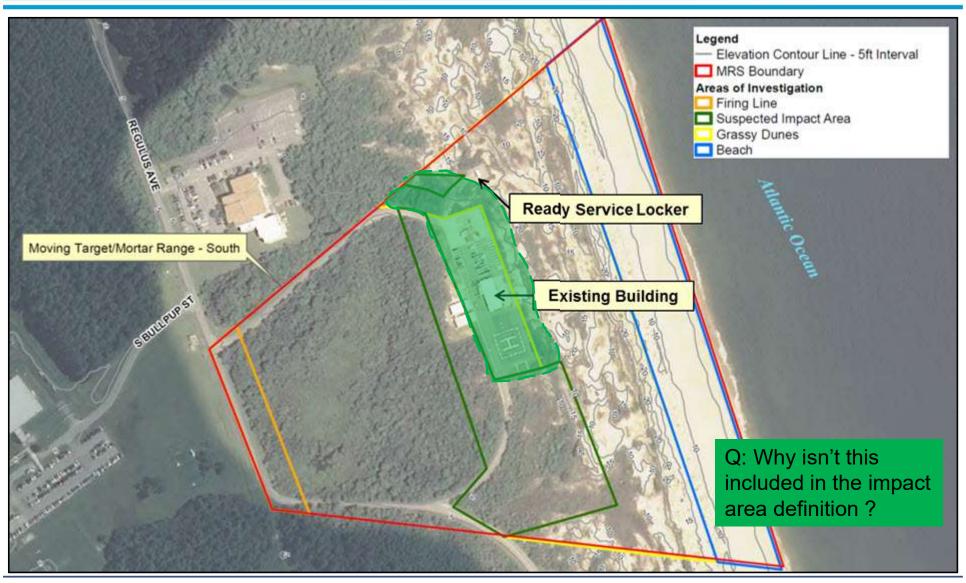
- The Preliminary Assessment identified the area as a "suspected" MEC area
 - Two moving target machine gun ranges were present in the southeastern portion of Dam Neck Annex, as observed on 1942 and 1943 aerials
 - Ranges were replaced by two mortar ranges after 1943
- No records documenting munitions use were found for the Moving Target Mortar Range – South (MTMR-S)
 - Munitions estimated based on the range boundaries and time period of use
 - Assumed .30 and .50 caliber small arms ammunition (SAA) and 60-mm and 81-mm mortars fired at site
- In 1960 facility constructed on site, no documentation of UXO removal associated with construction.





Site Layout





Investigation History

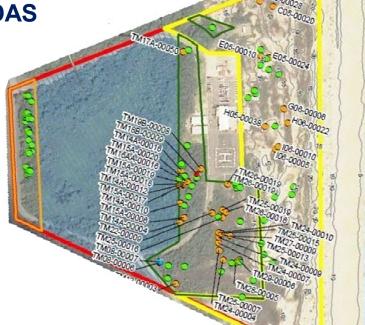


- 2010 Site Inspection
 - No MEC found on the ground surface

 (4) 81-mm projectiles found in the subsurface (up to 18" below ground surface)

All projectiles ultimately classified as MDAS

- 2013 Present Remedial Investigation
 - DGM survey identified 2,496 anomalies
 - Intrusive investigation of 735 anomalies:
 - (1) 60-mm, M49A2 projectile (fuzed) classified as MEC (10" below surface)
 - (49) 60-mm projectiles and (2) BDU-33s classified as MDAS
 - (199) expended SAA
 - Investigation put on-hold until MILCON construction complete



MILCON Meets MR Site



- FY13 MILCON project planned to demolish and construct a new facility
 - Project identified potential UXO impacts a month prior to award
 - Limits of disturbance for construction is within the estimated impact area of the mortar range
 - No known/documented history of MEC removal during construction of existing building and pavement (1960)
 - Project Award deemed critical
 - Existing buildings support mission-critical training element
 - Construction required to field new training platform
 - Project phased to allow use of existing building during construction
 - Decision was to award construction and perform UXO removal with EV contractor.
- ESS submitted to determine clearing requirements
 - Required UXO clearance down to at least 36" of native soil based on time of mortar range activity for full clearance
 - Partial clearance allowed where construction activities required less than
 24" of intrusive effort

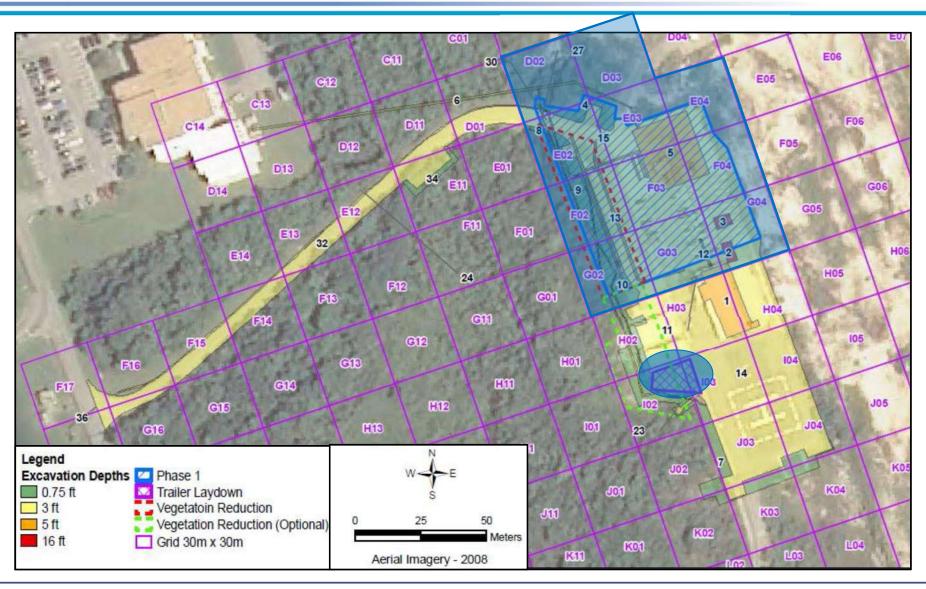
Site Layout – Construction Phasing





MILCON Phase 1





MILCON Phase 1 – Planned Events



- In 2015, an Advanced Geophysical Classification (AGC) Survey was conducted to support planned MILCON activities to:
 - Reduce potential contact with UXO
 - Asphalt removed from the Phase 1 portion of the site prior to AGC
 - DGM conducted (8000+ anomalies and 11 Saturated Response Areas identified)
 - AGC conducted (233 potential targets identified for intrusive investigation)
 - MEC and MPPEH was recovered (5 HE fuzed 60 mm mortars identified and intentionally detonated onsite per ESS)

Follow on 'intrusive activities' outside of the 'cleared' areas to be conducted

with Construction Support



AGC Dynamic Survey Results





MILCON Mayhem



- September 2015: UXO contractor provided MILCON contractor a figure showing footprint of cleared area without sufficient context.
- September 2015 May 2016: MILCON contractor conducted general grading and removal of subsurface wooden pilings without construction support
- May 2016: MILCON contractor operating excavator identified a mortar in the teeth of the bucket when performing grading/earthwork along the edge of the asphalt cut in May 2016
 - Operator recognized potential MEC as a result of previous experience
 - MILCON contractor did not fully understand the horizontal and vertical limits of what they could do on the site.
 - EV/UXO contractor thought only minor grading was needed and then all effort would be built up
- Construction stopped until path forward could be identified

"Cleared" Area - Provided to MILCON





Site Conditions – Prior to AGC Survey





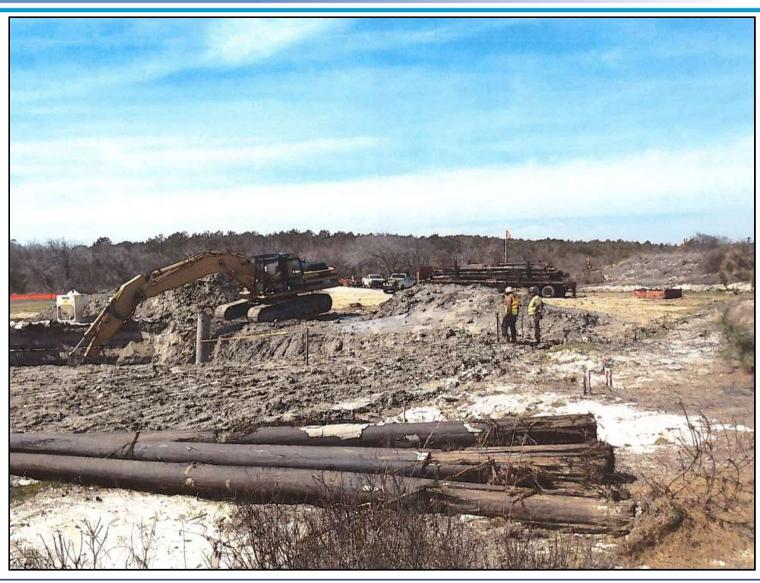
MILCON Site Surprises - Pilings





Piling Removal

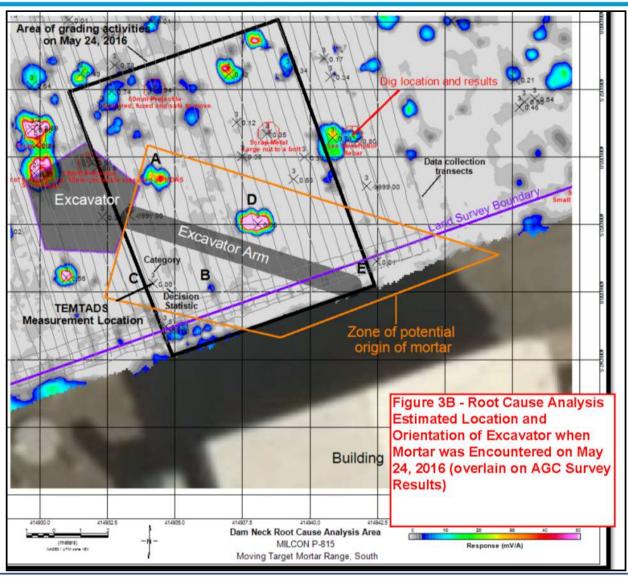




DON Environmental Restoration Training – March 6-8, 2018

Explosive Safety Incident Site Sketch





Post Incident RCA Site Photo





Resolution to MEC Issues



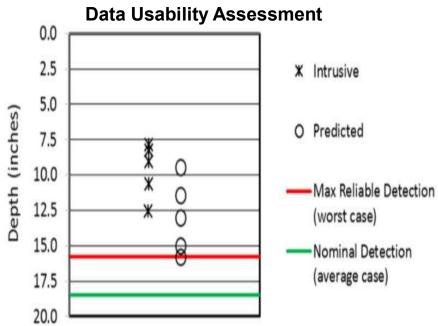
- NAVFAC EV conducted a time-critical removal action (TCRA) via RAC to address MEC within the Phase 1 area
 - TCRA consisted of DGM followed by soil removal in 12-inch lifts to a depth of 36" into the native soils
 - Lines of evidence suggested the 36" clearance depth is protective for construction activities and future use
 - A TCRA-specific MEC-QAPP and ESS were prepared for the project
 - Removal action took approximately 4 months to complete
 - Additional MEC was recovered at depths up to 28 inches into the native soil (most 12"-24")
- TCRA will be performed for the Phase 2 Area (anticipated June 2018)



Factors Contributing to Encounter



- A modified RI investigation process was used instead of a removal action to clear the site
- Failure to communicate actual extents of all intrusive efforts required for construction (means and methods)
- Several steps in the process indicated the approach would not be successful to meet MILCON needs were overlooked
 - Max depth of AGC detection for 60mm is ~26 inches, depth of removal for project up to 36 inches
 - Data Usability Assessment identified that the max reliable depth of detection was only 15.5bgs
 - AGC was conducted without removing base material for pavement, adding 4-6 inches of separation between items and sensors



Factors Contributing to Encounter



- Clear failure of communication between EV, CI, CM, and contractors
 - CM/CI/MILCON contractor failed to accurately communicate all intrusive/excavation requirements for construction (pilings, unsuitable soil, subbase for footings, grading,etc.)
 - Footprint of AGC (TEMTADS) investigation not provided in adequate detail to CM/CI/contractors/subcontractors
 - Need for continued construction support not completely received by CI
- MILCON not adequately prepared for work on a MR site
 - Personnel believed that all MEC issues had been addressed
 - MILCON contract did not identify all intrusive activities
 - MILCON contractor did not understand ESS and associated work approaches and limitations
 - Site controls (stakes/markers) were inadequate or temporary and easily removed/modified by ... anyone

Lessons Learned



- CLEAN contracts are prohibited from conducting removal actions, unless approved at Ech II/III in advance with sufficient justification
- ESSs for investigations should not be amended to accommodate a removal actions
- While AGC employs more sensors, the detection depth for a given item does not increase
- Data Usability Assessment must be performed concurrent with AGC investigation
- Extent of sites, MR or otherwise, need to be adequately defined within base master planning systems and use restrictions must be applied appropriately
- Everyone from designers to construction contractors need to be included in the assessment of where to clear and the clearance depths
- Means and Methods of construction must be fully understood (RSL pad) (spell out RSL)

ESPC South Loop Expansion





How to Do It Right!



- During the start of an ESPC project it was discovered that the directional drilling would impact a UXO site
- Construction project failed to identify the UXO impacts prior to award
- EV was made aware of the intrusive activities of the project prior to mobilization and coordinated on MEC-impacted areas of the project
- EV and FEAD worked with the ESPC contractor
 - Identified areas where MEC may be encountered
 - Assisted in clearance process including explosive safety
 - Project completed the with minimal cost/delay

Always easier to plan up front, than to rush to catch up

Energy Savings Performance Contract (ESPC)

South Condenser Loop

Project Scope

- Extend existing Condenser Cooling Water Loop (Cooled by Hampton Roads Sanitation District effluent) to Building 420 by directionally boring a 20" line
- Install new chillers at building 420 and directionally bore an 8" chilled water line to over to building 430 to replace existing chillers

Areas of potential MEC impact:

- Location where cooling loop borings surface in moving target mortar range north.
- Locations where chilled water lines surface and potential tie in points for the chillers in in moving target mortar range north



ESPC South Loop Expansion



Process to address Potential MEC impacts

- Step 1 Clearly define all aspects of the project that could require intrusive activities
- Step 2 Meet with contractor and FEAD on site
 - Include all subs performing work and the UXO contractor
 - Walk through detailed discussion of means and method for the construction
 - Ensure all parties understand the UXO hazards and what needs to be done to clear the site
 - Discuss any actions that could result in any penetration of the soil or ground disturbance like heavy equipment
- Step 3 Address all UXO clearance requirements in ESS and complete CERCLA documentation
- Step 4 Provide for follow on UXO support to address unforeseen conditions during drilling operations to avoid shutdown

ESPC South Loop Expansion Lessons Learned



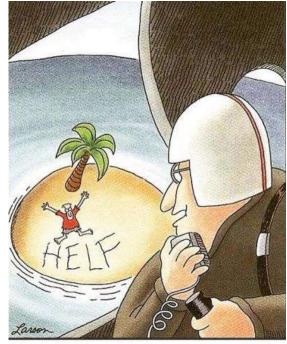
Activities driving UXO clearance

- Locations where the borings would pop up into the UXO area down to 36" below ground surface (BGS) based on ESS determination of hazard zone for the mortar impacts
- Angle of boring pop up to determine when it would enter the UXO potential impact zone
- Vertical and horizontal cleared area required to set boring machine
- Additional area(s) required to reset boring machine if they hit refusal
- Potholing required to accurately locate utilities that would have to be navigated
- Ground disturbance associated with mobilizing equipment, laydown areas and soil screening and stock piling areas
- Ground disturbance to get crane and other equipment adjacent to building to remove old chillers from building
- Areas to stage and fuse pipe for directional bore, dragging could cause surface disturbance
- Ground disturbance for equipment laydown areas

Resources for Help



- MR Workgroup members from each FEC, LANT, PAC, EXWC, and HQ
- NAVFAC HQ establishing process for assigning technical resources for MR projects
 - Support will be identified at inception of project
- Document reviews are conducted through established processes
 - QAPPs reviewed via NIRIS
 - ESSs and AARs reviewed through webESS
 - Review of other documents can be coordinated directly with support
- Quality Assurance of field activities
 - 3rd Party Contractor
 - NAVFAC LANT
 - NAVEODTECHDIV



"Wait! Wait! Cancel that. ... I guess it says 'helf."

Knowledge Check



- When compared to standard DGM, equipment used for AGC can detect items ___
 - A four times deeper
 - B twice as deep
 - C at roughly the same depth
 - D only at shallower depths
- True/False Investigations at MR sites are a suitable alternative for removal actions under CERCLA
- True/False An annotated survey map of cleared areas are sufficient to communicate the limits for excavation to a construction contractor working on an MR site.
- True/False NAVFAC has a singular resource available for "helf" with MR projects.

Parting Thoughts



- Investigations are not suitable proxies for removal actions
- Construction projects involving MEC require coordination to ensure full understanding from all stakeholders
- Engage technical support early and often
- Ensure relevant data is available and understood by all stakeholders
- If there is a record of a range it's likely there was a range. If you don't find it during your investigation – perhaps you aren't looking in the right place.

Contacts and Questions



Points of Contact

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Questions?